

Second Aquaphotomics European Conference

BOOK OF ABSTRACTS



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Table of Contents

Committees of the Second Aquaphotomics European Conference	3
Program of the Second Aquaphotomics European Conference	4
Poster presentations	6
Abstracts of the workshop presentations	7
Evaluating the spectral quality to improve the results of data analysis	8
A short introduction to aquaphotomics	9
Problem-Oriented Introduction to aquap2, a Free Multivariate Data Analysis Tool with Aquaphotomics Methods	10
Abstracts of the oral presentations	11
Aquaphotomics and its recent applications in the field of food science	12
Aquaphotomics holistic approach to identify differences in soil profiles	13
Near-Infrared Spectroscopy and Aquaphotomics for Early Detection of Fungal Diseases on Cucumber and durum wheat	14
Authentication of tomato paste concentrate with near-infrared spectroscopy	15
Detection of adulteration of linden honey with beet and rice syrup using Aquaphotomics	16
On the quantum nature of the two fluids in liquid water	17
Temperature Dependence Analysis of the NIR Spectra of Liquid Water confirms the existence of two phases, one of which is in a coherent state	18
DireWaves: Disarming resistant microbes with weak ELF magnetic fields	19
Water functionality – lessons learnt from NIR spectroscopy	20
Evaluation of Modified Handheld Spectrometer to Transmission Mode Using NaCl and Saccharose Solutions	21
Future Directions of Near-Infrared Spectroscopy in Food, Phyto and Bioanalysis	22
A real-time near-infrared process analytic technology for bioprocessing	23
Aquaphotomics as emerging technology denominator	24
Abstracts of the poster presentations	25
Fingerprinting Paprika Powder Adulteration by Aquaphotomics	26
Challenges in visible aquaphotomics	27
Method for Real-time Monitoring of Galactooligosaccharides Production by Means of Fourier Transform Near-Infrared Spectroscopy	28
Using NIR for sensing taste attributes of different melon varieties	29
Yunosato Spa Water Application using Near-Infrared Spectroscopy and Aquaphotomics	30
Estimating the spatiotemporal variability of water needs using LiDAR laser scanner in an apple orchard	31
Dairy products analysis – the role of first overtone water absorption region and aquaphotomics	32
Detection of multiple adulterants in tomato paste using near infrared spectroscopy	33
Sponsors	34

Aquaphotomics and its recent applications in the field of food science

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Aquaphotomics is a novel, rapidly emerging scientific field with promising applications in diverse fields of science including food science. Aquaphotomics, has recently become a method of choice for many researchers dealing with aqueous systems as it operates on the principle that, water acts as a molecular mirror to indirectly measure other molecules by its spectral fingerprint. This report aims to introduce some of the most recent results of near infrared spectroscopy (NIRS) and aquaphotomics in the field of food science. Experiments with adulterated Tokaj wines, honey, paprika powder and tomato paste concentrate and tests with yogurt, melon juice and Galactooligosaccharides solutions proved the wide spectrum of applicability of near infrared spectroscopy with the aquaphotomics approach using the spectral range of the first overtone of water. Artificially manipulated low grade Tokaj wines with grape concentrate were clearly distinguished from the non-adulterated wines and high quality Tokaj wines. Honey samples were, clearly distinguished and quantified when authentic honey samples were adulterated with rice and beetroot syrups in different concentrations. Differently diluted aqueous solutions of paprika powder containing corn flour at different concentrations, showed that authentic paprika samples could be discriminated from its adulterated counterparts with high accuracy and the level of adulteration could be predicted with lower than five percent error. Multiple adulterants in tomato paste concentrate were correctly classified and quantified with lower than one percent error regardless of the type and number of applied adulterants. Yogurts prepared with different starter cultures and added spring waters were successfully characterized. High accuracy was achieved when different species of melon and melons stored at different storage conditions were discriminated and their chemical and sensory properties were predicted. Concentration of individual carbohydrate fractions such as the monomers, the dimers, and oligomers were predicted with error of prediction lower than two percent in Galactooligosaccharides sampled from enzymatic bioreactor. The wide arsenal of successful applications signifies the high potential of aquaphotomics in the field of food science.